MSFC PRACA : 2003-02-12 08:41

MSFC Problem Reporting and Corrective Action (PRACA) System

WHOLE RECORD REPORT(+ ADDENDUM)

MSFC Record #	In-Flight Anomaly Number	Contractor Report Number	JSC#	KSC#
A17828	--	P-098	--	--

Problem Title
REPAIR OF A 0.300 IN. LONG PENETRANT CRACK WAS NOT BOUNDED BY EXISTING WIDE PANEL DATA

EICN#	ELEMENT	Contractor	FSCM#	FCRIT
--	ET	LOCKHEED MARTIN	--	3

HCRIT	Sys_Lvl	Misc Codes
1	--	A B C D E F G H I J K L M N O

HARDWARE	NOMENCLATURE	PART#	SER/LOT#	MANUFACTURER
EIM	--	--	--	--
LRU	--	--	--	--
NCA	LO2 BARREL WELD	80912400000-510	01210130	MAF

Test/Operation	Prevailing Condtion	F / U	Fail Mode	Cause
M - MFG	ZZ - NO PROBLEM	U	MU - MECH TOLRNCE	M - MANUFG

System	Defect	Material	Work Contact	Fail Date
PROPULSION	CS - CRACK	S - STRUCT	D. O'NEAL	01/07/2003

Received at MSFC	Date Isolated	FMEA Reference	IFA: Mission Phase	Mission Elapsed Time
01/16/2003	01/07/2003	N/A	--	--

Location	Symptom	Time Cycle
MAF	MU - MECH TOLRNCE	--

Effectivity Text
ET-130

Vehicle Effectivity Codes

Vehicle 1	Vehicle 2	Vehicle 3	Vehicle 4	Vehicle 5
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Mission Effectivity Codes

Mssn 1	Mssn 2	Mssn 3	Mssn 4	Mssn 5
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Estimated Completion Dates

MSFC Approved Defer Until Date	Contractor Req Defer Until Date	LVL 3 Close	Remark / Action
--	--	--	--

Investigation / Resolution Summary

Last MSFC Update	CN RSLV SBMT	Defer Date	Add Date	R/C Codes
01/28/2003	--	--	01/16/2003	0 - EXPL -- --

Assignee

Design	Chief Engineer	S & MA	Project	Project MGR
M. BUTLER	T. GREENWOOD	K. LAYNE	--	J. SMELSER

Approval

Design	Chief Engineer	S & MA	Project	Project MGR
M. BUTLER	T. GREENWOOD	K.LAYNE	--	J. SMELSER

PAC Assignee	PAC Review Complete	MSFC Closure Date	Status	F/A Completion
T. WHITE	TLW	01/28/2003	C - CLOSED	--

Problem Type	SEV	Program Name	REVL	OPRINC
--	--	--	--	--

FUNC MOD	Software Effectivity	Software Fail CD	SUBTYPE	Software Closure CD
--	-- -- -- -- --	--	--	--

RES PERSON L2	Approval Signature L3
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Related Document Type	Related Document ID
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Related Document Title
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Related Document Type	Related Document ID
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Related Document Title
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Related Document Type	Related Document ID
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Related Document Title
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Contractor Status Summary

Reliability/Quality Assurance Concerns, Recommendations:

Problem Description

THE REPAIR OF A 0.300 INCH LONG PENETRANT CRACK WAS NOT BOUNDED BY EXISTING WIDE PANEL DATA DUE TO THE REPAIR ATTEMPTS REQUIRED(EIGHT), THE LOCATION OF THE DEFECT(FUSION BOUNDARY) AND THE ADJACENT NARROW WELD LAND.

IN ADDITION, THE OVERALL BARREL BUILD CONSISTED OF THREE PANELS WITH NARROW WELD LANDS AND ONE SPECIAL ORDER PANEL WITH WIDER WELD LANDS.

Contractor Investigation/Resolution

01/16/2003 - CONTRACTOR SUBMITTED OPENER/CLOSURE REQUEST AS FOLLOWS:

GENERAL:

DURING THE BUILD OF ET 127'S LO2 BARREL, LATER REALLOCATED TO ET-130, A 0.300 INCH LONG PENETRANT CRACK WAS FOUND ALONG THE OB2 WELD FUSION BOUNDARY AT THE 84.7 - 85.0 INCH LOCATION. THE RESULTING REPAIR REQUIRED EIGHT ATTEMPTS (R8 HEAT LEVEL), PRIMARILY FROM THE OSL AND THIS REPAIR IN COMBINATION WITH THE NARROW WELD LAND OF THE ADJACENT

PANEL, CREATED A CONDITION THAT WAS NOT BOUNDED BY EXISTING WIDE PANEL DATA. THE INITIAL WELD LAND WIDTH WAS 1.25 INCHES (DWG MIN 1.50 INCH). THE EDGE OF THE REPAIR CAME WITHIN 0.450 INCH OF THE EDGE OF THE PRIMARY WELD LAND. WIDE PANEL TESTING WAS PERFORMED AND HARDNESS DATA TAKEN FROM HARDWARE TO CONFIRM HEAT EFFECT DID NOT EXTEND INTO THE 2ND WELD LAND.

OF THE FOUR PANELS USED FOR THIS BARREL BUILD, THREE HAD BEEN CUT APART FROM OTHER PANELS FOR VARIOUS REASONS RESULTING IN REDUCED WELD LAND WIDTHS ALONG AT LEAST ONE WELD LAND ON EACH RECYCLED PANEL. THE FOURTH PANEL WAS A SPECIAL ORDER PANEL THAT HAD WIDER THAT NORMAL WELD LANDS TO ACCOMMODATE THE NARROW LANDS OF THE OTHER PANELS AND MAINTAIN THE REQUIRED BARREL CIRCUMFERENCE.

TASK I FAILURE/PROBLEM INVESTIGATION

A. EVALUATE THE ACCEPTANCE OF THIS LO2 BARREL ASSEMBLY FOR FLIGHT.

RESPONSIBILITY: G. WADGE/4420 - E. SWEET/4400
ECD: COMPLETE 10/28/02

CLOSURE STATEMENT:

OB2 WELD - WIDE PANEL TESTING AS WELL AS ANALYSIS USING STANDARD REPAIR ALLOWABLES DEMONSTRATED THE WELD REPAIR MEETS FLIGHT REQUIREMENTS, SHOWING POSITIVE MARGIN OF SAFETY (MS). AN EVALUATION OF THE PRIMARY AND SECONDARY WELD LANDS WAS ALSO PERFORMED VIA HARDNESS TESTING, THE RESULTS SHOWING MINIMAL EFFECT DUE TO REPAIR. OB1, OB3 AND OB4 WELDS - DETERMINED ACCEPTABLE FOR FLIGHT WITH NO AFFECT TO MS.

REFERENCE SENIOR MANAGEMENT REVIEW (SMR 02-005), PRESENTED 10/28/02, FOR FURTHER DETAILS.

*CAUSE:

NO CAUSE AND CORRECTIVE ACTION REQUIRED.

TASK II CORRECTIVE ACTION

NONE REQUIRED.

TASK III CLEARANCE OF EFFECTIVITIES

THIS REPAIR IS UNIQUE TO THIS ET-130. NO ADDITIONAL CLEARANCE IS REQUIRED.

TASK IV CAPS CLOSURE SUMMARY

ET-130'S LO2 BARREL CONSISTS OF THREE RECYCLED PANELS WITH ONE OR MORE NARROW WELD LANDS AND ONE SPECIAL PANEL ORDERED WITH WIDER THAN NORMAL WELD LANDS TO ACCOMMODATE THE OTHER PANELS' NARROW LANDS AND MAINTAIN THE REQUIRED BARREL CIRCUMFERENCE. DURING THE BUILD, A PENETRANT CRACK WAS FOUND ALONG A FUSION BOUNDARY OF THE OB2 WELD. DUE TO THE NARROW WELD LAND OF THE ADJACENT PANEL, THE LOCATION OF THE DEFECT AND THE EIGHT HEATS (R8) REQUIRED TO REPAIR THE DEFECT, WIDE

PANELS AND HARDNESS READINGS WERE REQUIRED. THE RESULTING ANALYSIS SHOWED THE REPAIR AND WELD ACCEPTABLE FOR FLIGHT WITH POSITIVE MS. EVALUATION OF THE OTHER THREE WELDS (OB1, OB3, OB4) FOUND NO EFFECT TO MS. BOTH A MAF SENIOR MANAGEMENT REVIEW AND MSFC SENIOR MANAGEMENT REVIEW HAVE BEEN CONDUCTED AND THIS REPAIR AND BARREL BUILD FOUND ACCEPTABLE FOR FLIGHT.

MSFC Response/Concurrence

01/28/2003 - BOARD ACCEPTED PROBLEM CLOSURE RATIONALE. SIGNATURES ARE ON FILE IN THE PAC. THIS PROBLEMIS OFFICIALLY CLOSED.

MSFC Problem Reporting and Corrective Action (PRACA) System

ASSESSMENT ADDENDUM REPORT

MSFC Report#	**IFA#**	**Contractor RPT#**	**JSC#**	**KSC#**	**EICN#**
A17828	--	P-098	--	--	--

Asmnt Part#	**Asmnt Part Name**	**Asmnt Serial/Lot#**
80912400000-510	LO2 BARREL	01210130

HCRIT CD	**FCRIT CD**	**CAUSE CD**	**FAIL MODE**
1	3	M - MANUFG	MU - MECH TOLRNCE

Asmnt FMEA	**Asmnt FM**	**FMEA CSE**	**FMEA SCSE**
--	--	--	--
Asmnt FMEA	**Asmnt FM**	**FMEA CSE**	**FMEA SCSE**
--	--	--	--
Asmnt FMEA	**Asmnt FM**	**FMEA CSE**	**FMEA SCSE**
--	--	--	--

Correlated Part#	**Correlated Part#**	**Correlated Part#**
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Associated LRU#	**Associated LRU#**	**Associated LRU#**
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MAJOR DESIGN CHANGES

APRV DATE	**DESCRIPTION OF CHANGES**
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ASSESSMENT TEXT